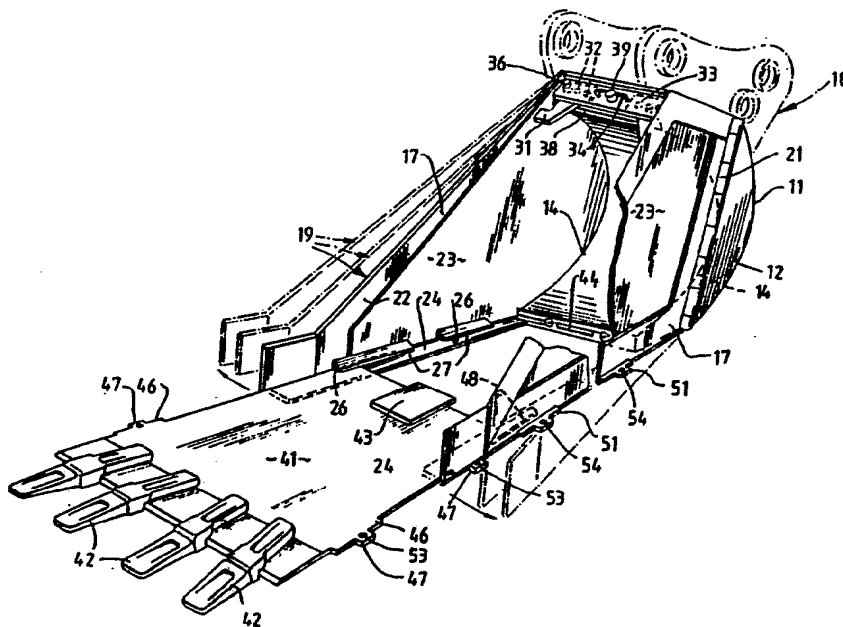




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<p>(21) International Application Number: PCT/AU89/00501</p> <p>(22) International Filing Date: 21 November 1989 (21.11.89)</p> <p>(30) Priority data: PJ 1545 21 November 1988 (21.11.88) AU</p> <p>(71) Applicant (for all designated States except US): BOWVILLE PTY. LTD. [AU/AU]; 54 Tyabb Road, Tyabb, VIC 3913 (AU).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): PACKER, Gregory, Thomas [AU/AU]; 49 Kunyung Road, Mt. Eliza, VIC 3930 (AU).</p> <p>(74) Agent: COWIE, CARTER & HENDY; 71 Queens Road, Melbourne, VIC 3004 (AU).</p> <p>(81) Designated States: AT, AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CF (OAPI patent), CG (OAPI patent), CH, CM (OAPI patent), DE, DK, ES, FI, FR (European patent), GA (OAPI patent),</p>		<p>GB, HU, IT (European patent), JP, KP, KR, LK, LU, MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NO, RO, SD, SE, SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p> <p>Published With international search report. With amended claims.</p>

(54) Title: EXCAVATOR BUCKET



(57) Abstract

A backhoe or excavator bucket is provided which has a back bucket section (11), a bucket top (16) incorporating lifting attachment brackets (18) and a pair of relatively movable side panels (19) connected to the back section (11) by hinges (21) which enable the spacing between the side panels (19) to be varied. A plurality of different sized bases (41a, 41b and 41c) are provided, each of which is separately engageable with the side panels (19) at different spacings to provide different sizes of bucket. Each of the side panels (19) at its front upper edge has a pivoted bracket (31) located to an end plate (38) of the bucket top (16) by pins (36) on a locking bar (33) which extend through selected holes (32) in the brackets (31). The side panels may also have channels (27) and/or slots (49) to receive lugs (47) on the side edge of a base (41) to locate the base (41) relative to the side panels (19).

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EXCAVATOR BUCKETField of the Invention

This invention relates to an excavator bucket and relates particularly to an excavator bucket which
5 can be adjusted for size.

Buckets used on excavators, and backhoes, are made in various sizes for different purposes. Thus, a narrow bucket for excavation of a narrow trench may have a width of 350 mm whereas a large bucket for general
10 excavation and/or backhoe work may have a width of 600 mm or more. Naturally, buckets of different widths also tend to have different capacities.

Background of the Invention

When an excavator, or backhoe, is being used,
15 it is generally necessary for the operator to carry a range of buckets which can be changed on the machine to suit the different excavation requirements. However, in order to change from one bucket size to another, it is necessary to remove the bucket completely from the
20 excavator operating arms. This can be a relatively time consuming operation.

It is therefore desirable to provide an excavator bucket which does not need to be removed from the machine in order to change the size thereof.

25 It is also desirable to provide an improved construction of excavator bucket which enables the bucket to be used for a variety of purposes.

It is also desirable to provide an excavator bucket which is relatively simple in construction, is easy to
30 manufacture and is simple to use.

Summary of the Invention

According to an aspect of the present invention there is provided a backhoe or excavator bucket comprising a back bucket section, a bucket top incorporating lifting
35 attachment means, a pair of side panel means and base means, said side panel means being relatively movable to vary the spacing thereof at or adjacent the base, and the base means being removably connected to said side

panel means.

The side panel means may be relatively movable by being slidably connected to the back section, or to the bucket top. Alternatively, the side panel means may be pivotally connected to the back section or to the bucket top.

A plurality of different dimensioned base means may be provided to engage with the side panel means at different spacings thereof to thereby provide different sizes and/or capacities for the bucket. In one form of the invention, the side panel means are provided with channels which engage with side edge portions of the base means. Appropriate securing pins or the like may be provided to lock the side panel means and the base means together.

In another form of the invention, the side panel means are provided with slots adjacent the lower edges and the base means is provided with lugs which engage through the slots to locate the base means relative to the side panel means.

In the preferred form of the invention, the side panel means are pivotally attached to the back bucket section and the interengagement between the side panel means and the base means is through a combination of channels and slots on the side panel means and lugs on the base means which extend through the slots. The side panel means are also located at their front, upper edges by pivoted brackets which are located by pin means to the bucket top.

In order that the invention will be more readily understood, one embodiment thereof will now be described with reference to the accompanying drawings.

Description of the Drawings

Figure 1 is a perspective view of an excavator bucket in accordance with the invention,

Figure 2 is a front elevational view of the bucket of Figure 1 without the base,

Figure 3 is a part sectional, side elevational

view of the bucket of Figure 1, excluding the base, and

Figure 4 illustrates three different sized bases for use with the bucket of Figure 1.

Description of the Preferred Embodiment

5 The excavator bucket illustrated in the drawings is one form of the invention and it will be appreciated that the invention may be embodied in different constructions of excavator bucket employing the inventive features described herein. In the particular embodiment illustrated
10 the bucket comprises a back or rear bucket section 11 which is curved from top to bottom and comprises an outer rear wall 12 and an inner wall 14 spaced from the outer wall 12. The outer wall 12 merges into a top wall 16, and the side edges of the inner and outer walls are
15 connected by side plates 17 to form a rigid bucket rear structure.

 Lifting attachment brackets 18 (shown in Figure 1) are secured to the top wall 16 to enable the bucket to be used by appropriate backhoe or excavator machines.
20 The lifting attachment brackets may be of any suitable design commensurate with the equipment with which the bucket is to be used.

 Two bucket side panels 19 are connected to the bucket rear structure by hinges 21 which are fixed to
25 the side plates 17. The side panels 19 of this embodiment are formed with peripheral perimeter sections 22 welded to an infill plate 23. The lower edges of the side panels 19 are provided with inwardly extending base supports 24. Spaced from the base supports 24 on each side panel
30 19 are one or more locating strips 26 which, with the base supports 24, define channel ways 27. The locating strips 26 are braced against the side panels 19 by angularly extending gussets 28.

 Adjacent the front edge of each side panel at
35 the top thereof is a pivoted bracket 31 having one or more holes 32 therein. A removable locking bar 33 having a handle 34 is provided with two pins 36 adapted to engage selected holes 32 and pass therethrough into cooperating

holes 37 in an end plate 38 extending between the top wall 16 and inner wall 14 of the rear bucket section. A guide pin 39 extending outwardly from the end plate 38 passes through a guide hole in the locking bar 33, and a locking pin (not shown) is engageable with the guide pin to lock the locking bar 33 in position. The locking bar 33 distributes load from the lifting attachment brackets 18 directly to the side panels 19 through the side brackets 31.

Referring to Figure 4, there is illustrated three different sized bases 41a, 41b and 41c. Base 41a is the narrowest base. This base is provided with three teeth 42 extending from the front thereof while at the rear end is a locating plate 43. The locating plate is adapted to engage within a recess 44 provided between the lower edges of the outer rear wall 12 and inner wall 14 of the base structure.

The side edges of the bases 41a, 41b and 41c are formed with outwardly extending support parts 46 each of which has a locking lug 47. The bases 41b and 41c are also provided with rearwardly extending fingers 48 which engage within spaces between the edges of the back structure and the side panels 19 when the side panels are pivoted to an open position. Fingers are not necessary on the base 41a as this base is used when the side panels are in their closest position at which they engage the sides of the back structure.

The support parts 46 engage within slots 49 in the side panels 19. The side panels have corresponding outwardly extending locking lugs 51 which cooperate with the locking lugs 47 on the bases 41 and locking pins 52 are engaged through holes 53 and 54 in the respective locking lugs.

In use of the bucket of the present invention, the side panels 19 may be pivoted on the hinges 21 to occupy any desired open position three of which are illustrated in Figure 1. As many bases as is desired may be provided corresponding to various opening widths

of the side panels 19.

To locate a base in position, the locking bar 33 is removed by its handle 34 so that the pins 36 are disengaged from the holes 32 in brackets 31. The side panels 19 can then be pivoted to any desired open position for reception of a base 41. A base of the desired width is then engaged with the bucket structure by engaging the base locating plate 43 in the recess 44. This engagement can either be by sliding the base along the channel ways 27 formed by the base supports 24 and locating strips 26 or by opening the sides sufficiently so as to clear the edges of the base locking lugs 47. With the base 41 located by its locating plate 43 in the recess 44, the side panels can then be closed upon the side edges of the base. As the side panels 19 engage with the base 41, the support parts 46 pass through the slots 49 in the side panels 19 until the locking lugs 47 align with the cooperating locking lugs 51. Locking pins 52 are then inserted in place to hold the base 41 securely relative to the side panels 19.

The locking bar 33 is then relocated so that the pins 36 engage the appropriate holes 32 in the side panel brackets 31. The pins 36 pass through the cooperating holes 37 in the end plate 38, and a locking pin is fitted to the guide pin 39 to prevent inadvertent removal of the handle 34 during operation of the bucket.

The bucket size can be easily changed by simply removing the locking bar 33, the locking pins 52, pivoting the side panels 19 and replacing the base with one of a different size. The time taken to replace a base in bucket is substantially less than that to replace the known excavator buckets on the excavator equipment. Additionally, it is not necessary with the present invention to carry a plurality of buckets, which are relatively heavy and occupy substantial space. A single bucket structure with a plurality of bases is all that is necessary to provide a wide range of bucket sizes.

Many modifications may be made in the design and/or

construction of an excavator bucket in accordance with the present invention. In a preferred modification, the bases 41 are provided with longitudinally extending base strips adjacent the side edges which act to protect the base support strips 24 on the side panels 19 on any sideways movement of the bucket in use. Further, lugs may be provided on the side panels 19 to protect the locking lugs 47, and locking pins 52, against damage during use.

It will be appreciated that the hinge 21 connecting the side panels 19 to the bucket rear structure may be of any suitable construction or may be replaced by other suitable means for interconnecting the parts whilst allowing for relative movement therebetween. Such alternatives to fixed pin hinges are well known.

Many other modifications may be made in the design and/or construction of an adjustable excavator bucket in accordance with the present invention and all such modifications which come within the scope of the invention shall be deemed to be within the ambit of the above description.

Claims.

1. A backhoe or excavator bucket comprising a back bucket section, a bucket top incorporating lifting attachment means, a pair of side panel means and base means, characterised in that said side panel means are relatively movable to vary the spacing therebetween at or adjacent the base, and said base means is removably connected to said side panel means.
2. A bucket according to claim 1 characterised in that at least one of said side panel means is slidably connected to said back section or to said bucket top.
3. A bucket according to claim 1 characterised in that at least one of said side panel means is pivotally connected to the back section or to the bucket top.
4. A bucket according to claim 3 characterised in that each of said side panel means is pivotally attached to the back bucket section and is located at its front upper edge by a pivoted bracket located by pin means to the bucket top.
5. A bucket according to claim 4 characterised in that said pivoted brackets are located to the bucket top by locating pins on a removable locking bar, said locating pins extending through selected holes in said brackets to be received in cooperating recesses or openings in an end plate of said bucket top.
6. A bucket according to claim 5 characterised in that a guide pin extending outwardly from said end plate passes through a guide hole in said locking bar to locate said locking bar and a locking pin is engageable with the guide pin to lock said locking bar in position.
7. A bucket according to claim 1 characterised in that each of said side panel means is provided with channels which engage with side edge portions of said base means.
8. A bucket according to claim 1 characterised in that each of said side panel means is provided with slots adjacent its lower edge, and said base means is provided with lugs which engage through said slots to locate said

base means relative to said side panel means.

9. A bucket according to claim 1 wherein each of said side panel means has a combination of channels and slots adjacent its lower edge and said base means is provided with lugs which extend through said slots to locate said base means relative to said side panel means.

10. A bucket according to claim 1 characterised in that said base means is provided at its rear end with a locating plate which engages within a recess provided in the lower part of said back bucket section.

11. A bucket according to any one of the preceding claims characterised in that securing means in the form of pins, bolts or the like are provided to lock the side panel means and base panel means together.

12. A backhoe or excavator bucket comprising a back bucket section, a bucket top incorporating lifting attachment means, a pair of side panel means and base means, characterised in that said side panel means are relatively movable to vary the spacing therebetween at or adjacent the base, and a plurality of different dimensioned base means are provided each of which is separately engageable by removable connections with the side panel means at different spacings thereof to provide different sizes and/or capacities for the bucket.

[received by the International Bureau
on 6 April 1990 (06.04.90);
original claims 2 and 3 cancelled; claim 1 amended; claims 4-11
amended and renumbered as claims 2-9; claims 12 replaced by new
claim 10 (2 pages)]

1. A backhoe or excavator bucket comprising a back bucket section, a bucket top incorporating lifting attachment means, a pair of side panel means and base means, characterised in that at least one of said side panel means is pivotally connected to the back bucket section or to the bucket top so that said side panel means are relatively movable to vary the spacing therebetween at or adjacent the base, and said base means is removably connected to said side panel means.

2. A bucket according to claim 1 characterised in that each of said side panel means is pivotally attached to the back bucket section and is located at its front upper edge by a pivoted bracket located by pin means to the bucket top.

3. A bucket according to claim 2 characterised in that said pivoted brackets are located to the bucket top by locating pins on a removable locking bar, said locating pins extending through selected holes in said brackets to be received in cooperating recesses or openings in an end plate of said bucket top.

4. A bucket according to claim 3 characterised in that a guide pin extending outwardly from said end plate passes through a guide hole in said locking bar to locate said locking bar and a locking pin is engageable with the guide pin to lock said locking bar in position.

5. A bucket according to claim 1 characterised in that each of said side panel means is provided with channels which engage with side edge portions of said base means.

6. A bucket according to claim 1 characterised in that each of said side panel means is provided with slots adjacent its lower edge, and said base means is provided with lugs which engage through said slots to locate said base means relative to said side panel means.

7. A bucket according to claim 1 wherein each of said side panel means has a combination of channels and slots adjacent its lower edge and said base means is provided with lugs which extend through said slots to

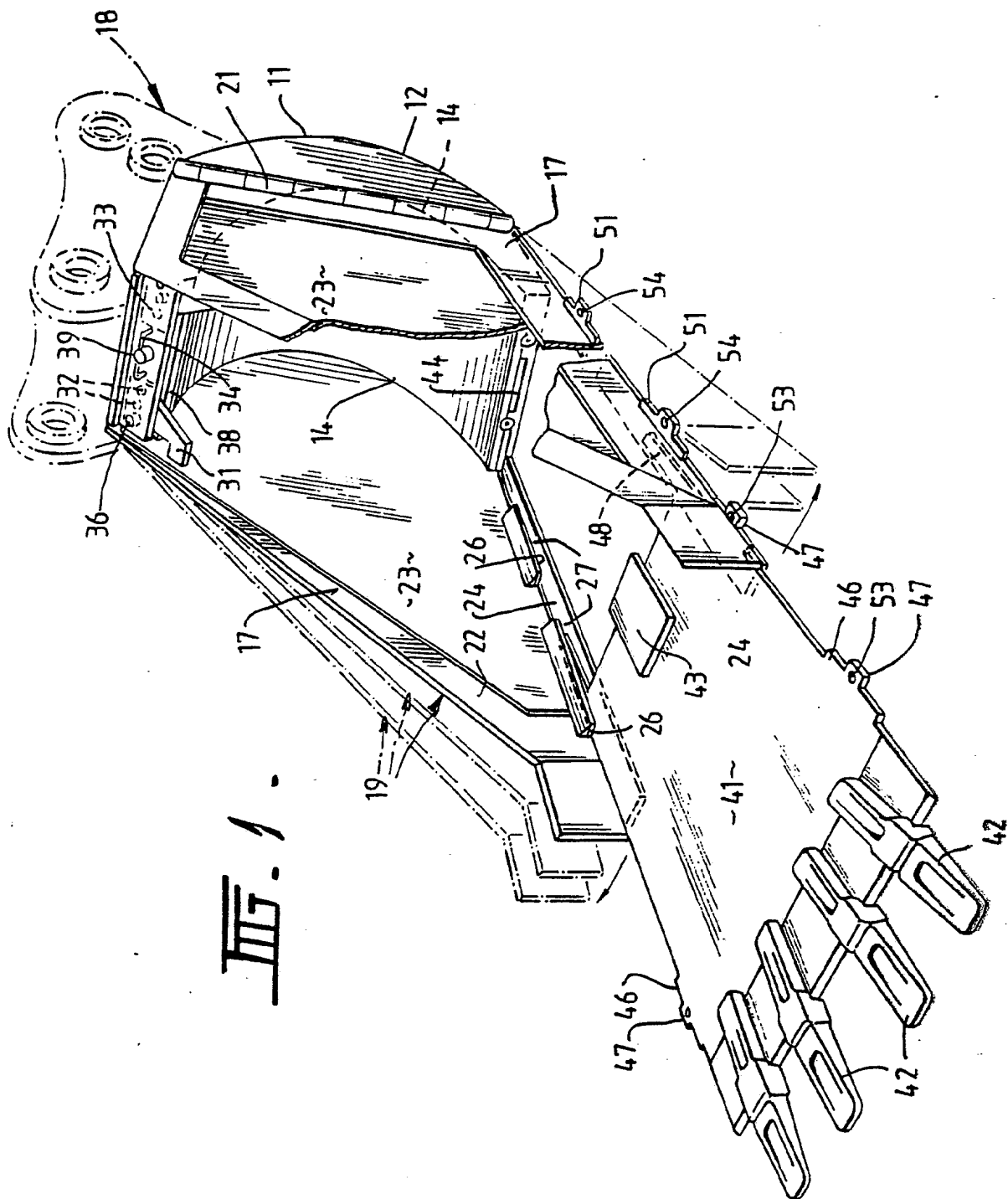
locate said base means relative to said side panel means.

8. A bucket according to claim 1 characterised in that said base means is provided at its rear end with a locating plate which engages within a recess provided in the lower part of said back bucket section.

9. A bucket according to any one of the preceding claims characterised in that securing means in the form of pins, bolts or the like are provided to lock the side panel means and base panel means together.

10. A backhoe or excavator bucket comprising a back bucket section, a bucket top incorporating lifting attachment means, a pair of side panel means and base means, characterised in that at least one of said side panel means is pivotally connected to the back bucket section or to the bucket top so that said side panel means are relatively movable to vary the spacing therebetween at or adjacent the base, and a plurality of different dimensioned base means are provided each of which is separately engageable by removable connections with the side panel means at different spacings thereof to provide different sizes and/or capacities for the bucket.

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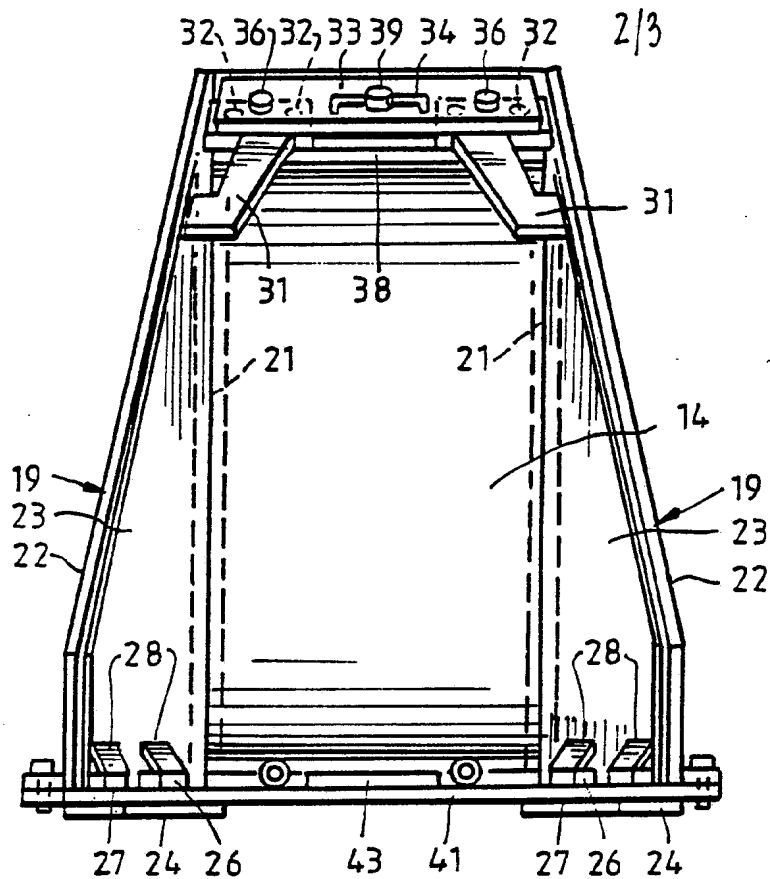


Fig. 2.

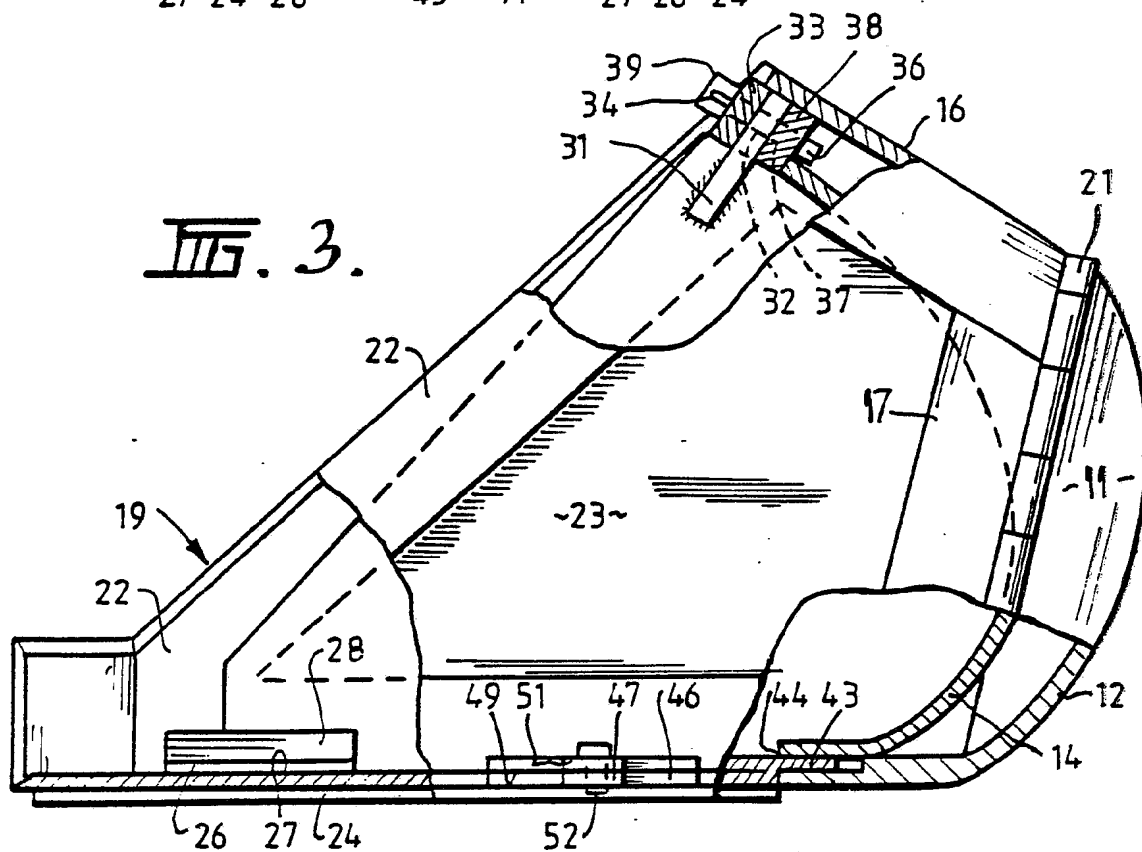
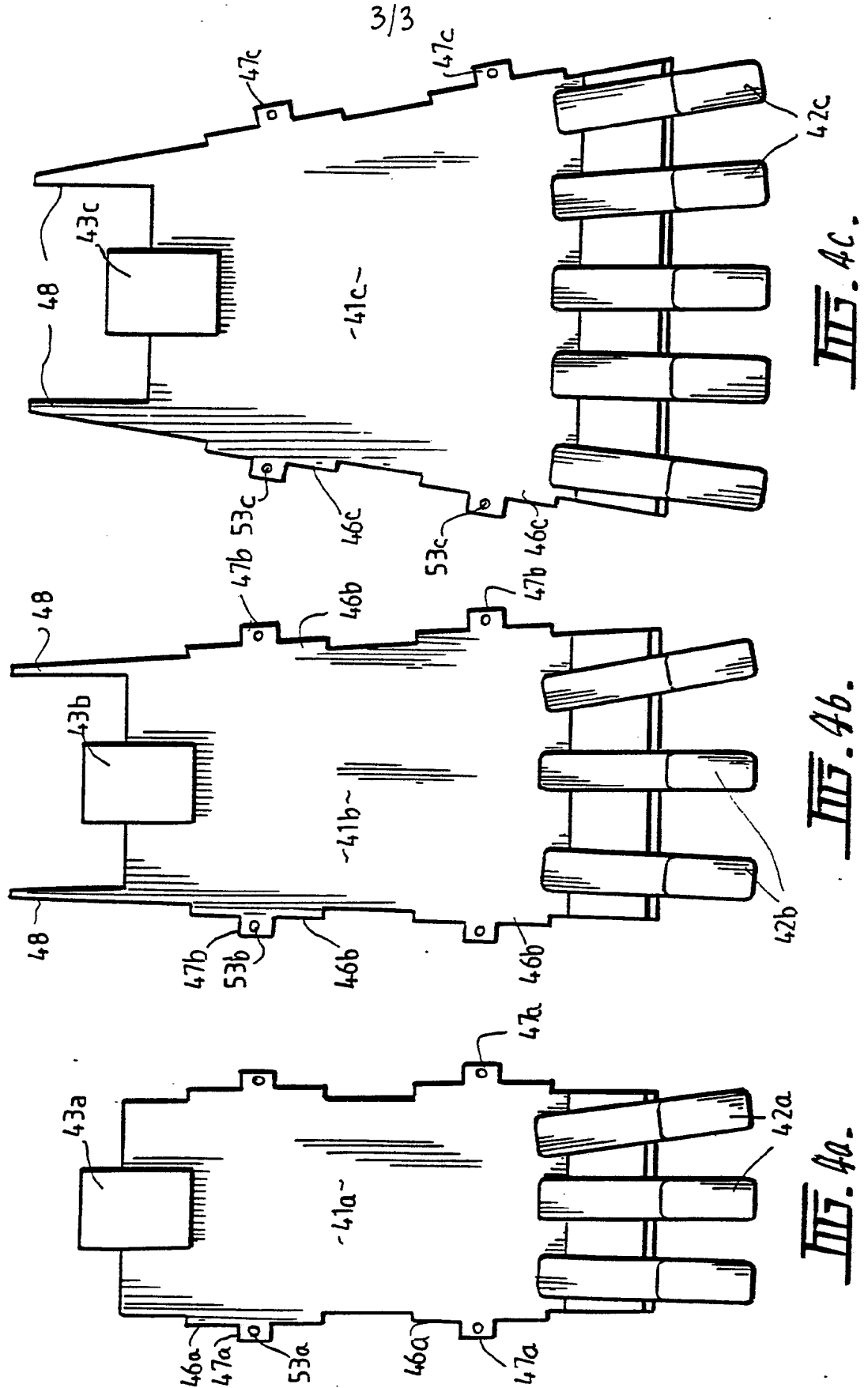


Fig. 3.

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INTERNATIONAL SEARCH REPORT

International Application No. **PCT/AU 89/00501**

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6		
According to International Patent Classification (IPC) or to both National Classification and IPC Int. Cl. ⁴ E02F 3/40		
II. FIELDS SEARCHED		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC	E02F 3/40, 3/70	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8		
AU: IPC as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 9		
Category*	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X	Patents Abstracts of Japan, M-389, page 34, JP,A,60-23524 (WATANABE) 6 February 1985 (06.02.85)	1,2,11
X	Derwent Abstract Accession no. F2612W/20, Class Q42, NL,A,145623 (VAN LINT) 15 April 1975 (15.04.75)	1,12
X	Derwent Abstract Accession no.86-203014/31, Class Q42, SU,A,1199867 (VNNIISTROIDORMASH) 23 December 1985 (23.12.85)	1,3,11
A	Derwent Abstract Accession no.84-040839/07, Class Q41Q42, SE,A,8301423 (PERSSON) 30 January 1984 (30.01.84)	1-12
CONTINUED		
<p>* Special categories of cited documents: 10 "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed "&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search 26 February 1990 (26.02.90)		Date of Mailing of this International Search Report 5 March 1990
International Searching Authority Australian Patent Office		Signature of Authorized Officer D.G. FRY <i>D.G. FRY</i>

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category*	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	Derwent Abstract Accession no.F2917W/20, Class Q42, SU,A,435324 (RURAL CONS DES INST) 25 November 1974 (25.11.74)	1-12
A	Patents Abstract of Japan, M-81, page 125, JP,A,56-59929 (OKABE) 23 May 1981 (23.05.81)	1-12